

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of: Pamela C. Iraneta, *et al.*

Application No.: 10/591,377

Confirmation No.: 8061

Filed: August 31, 2006

Art Unit: 1797

For: *FRIT FOR HIGH PRESSURE LIQUID  
CHROMATOGRAPHY*

Examiner: E.G. Therhorn

**AMENDMENT AND REPONSE TO FINAL OFFICE ACTION  
SUBMITTED CONCURRENTLY WITH REQUEST FOR CONTINUED EXAMINATION**

MS RCE  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

**INTRODUCTORY COMMENTS**

Applicants submit this paper in response to the final Office Action dated September 24, 2010 issued in the above-referenced patent application. Applicants believe that no fees, other than the fee for a Request for Continued Examination under 37 C.F.R. § 1.17(e) and a one-month extension of time under 37 C.F.R. § 1.17(a)(1) are required for consideration and entry of this paper. Nevertheless, Applicants authorize the Director to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to Deposit Account No. 04-1105, under Order No. 60326US(49991).

Please amend the application as follows:

**Amendments to the Claims** are reflected in the listing of claims, which begins on page 2 of this paper.

**Remarks** begin on page 10 of this paper.

### **AMENDMENTS TO THE CLAIMS**

Please amend claims 1, 2, 4, 39, 87, 118, 181, 241-244, 249-251, 257, and 267-272 and cancel claims 40, 238-240, 245, 246, 264, and 273-278 without prejudice or disclaimer. The following listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently amended) A frit comprising:  
a porous support structure having a plurality of void spaces; and  
a plurality of ~~secondary~~ particles sintered within the porous support structure to each other, to the porous support structure surrounding the void spaces, or both, the particles dimensioned with respect to the void spaces for the frit to retain packing materials with diameters of less than about 2.5 microns,  
wherein the void spaces are filled with the plurality of ~~secondary~~ particles such that the frit has a density of at least 50% by volume[[,]]  
~~wherein the secondary particles are dimensioned with respect to the void spaces for the frit to retain packing materials with diameters of less than about 2.5 microns, and~~  
~~wherein the secondary particles are sintered within the porous support structure to each other, to the porous support structure surrounding the void spaces, or both.~~
2. (Currently amended) The frit of claim 1, wherein the void spaces are partially filled with the ~~secondary~~ particles.
3. (Canceled)
4. (Currently amended) The frit of claim 1, wherein the ~~secondary~~ particles form ~~within the void spaces~~ a secondary pore network within the void spaces, the secondary pore network having a pore size that is capable of retaining chromatographic packing materials with diameters of less than about 2.5 microns.
- 5.-7. (Canceled)

8. (Original) The frit of claim 1, wherein the porous support structure comprises a material selected from the group consisting of metals, metal alloys, metal oxides, ceramics, and polymers.

9. (Original) The frit of claim 1, wherein the porous support structure comprises a material selected from the group consisting of sinterable metals, sinterable metal alloys, sinterable metal oxides, sinterable ceramics, and sinterable polymers.

10. (Previously presented) The frit of claim 1, wherein the porous support structure comprises a material selected from the group consisting of stainless steel, titanium, PEEK, polyethylene, polypropylene, synthetic resinous fluorine-containing polymers glass, silica, titania, and zirconia.

11. (Original) The frit of claim 1, wherein the porous support structure comprises stainless steel.

12. – 38. (Canceled)

39. (Currently amended) A frit configured to be received in a tubular chamber, the frit comprising:

a porous support structure having a plurality of void spaces; and

a plurality of ~~secondary~~ particles sintered within the porous support structure to each other, to the porous support structure surrounding the void spaces, or both,

wherein the void spaces are filled with the plurality of ~~secondary~~ particles so as to retain chromatographic packing materials, the ~~secondary~~ particles being dimensioned with respect to the void spaces and the packing materials such that the frit retains the packing materials with diameters of less than about 2.5 microns, ~~and~~

~~wherein the secondary particles are sintered within the porous support structure to each other, to the porous support structure surrounding the void spaces, or both.~~

40. – 86. (Canceled)

87. (Withdrawn – currently amended) A method of preparing a frit for use in a high pressure liquid chromatography column, comprising the steps of:

providing a porous support structure having a plurality of void spaces; [[and]]

filling the void spaces with ~~secondary~~ particles, wherein the ~~secondary~~ particles are dimensioned with respect to the void spaces such that the frit retains chromatographic packing materials with particle diameters of less than about 2.5 microns; and

sintering the particles within the porous support structure to each other, to the porous support structure surrounding the void spaces, or both.

88. – 117. (Canceled)

118. (Withdrawn – currently amended) A method of preparing a frit for use in a high pressure liquid chromatography column, comprising the steps of:

providing a porous support structure having a plurality of void spaces;

filling the void spaces with ~~secondary~~ particles dimensioned with respect to the void spaces such that the frit retains chromatographic packing materials with particle diameters of less than about 2.5 microns;

sintering the particles within the porous support structure to each other, to the porous support structure surrounding the void spaces, or both; and

orienting the porous support structure filled with the ~~secondary~~ particles such that the ~~secondary~~ particles remain immobilized in the void spaces during use[[,]]

~~wherein the secondary particles are dimensioned with respect to the void spaces such that the frit retains chromatographic packing materials with particle diameters of less than about 2.5 microns.~~

119. – 180. (Canceled)

181. (Withdrawn – currently amended) A method for separating and quantifying solutes in a liquid stream, comprising the steps of:

providing a tubular chamber having first and second ends, the tubular chamber being filled with chromatographic packing materials;

inserting at least one frit in the inlet and outlet fittings, the frit having:

a porous support structure having a plurality of void spaces,

a plurality of ~~secondary~~ particles sintered within the porous support structure to each other, to the porous support structure surrounding the void spaces, or both,

wherein the void spaces are filled with the plurality of ~~secondary~~ particles so as to retain chromatographic packing materials, the particles being dimensioned with respect to the void spaces and the packing materials such that the frit retains the packing materials with diameters of less than about 2.5 microns;~~and~~

~~wherein the secondary particles are dimensioned with respect to the void spaces such that the frit retains chromatographic packing materials with particle diameters of less than about 2.5 microns;~~

propelling the liquid stream through the tubular chamber, the liquid stream contacting the chromatographic packing materials in the tubular chamber;

injecting a sample into the liquid stream; and

detecting individual components in the liquid stream as the liquid stream exits the second end of the tubular chamber.

182. – 236. (Canceled)

237. (Previously presented) The frit of claim 1, wherein the porous support structure comprises 316 stainless steel.

238.-240. (Canceled)

241. (Currently amended) The frit of claim 1, wherein the ~~secondary~~ particles are about 5 microns in diameter or smaller.

242. (Currently amended) The frit of claim 1, wherein the ~~secondary~~ particles range from about 3 microns to about 5 microns in diameter.

243. (Currently amended) The frit of claim 1, wherein the ~~secondary~~ particles are about 3.5 microns in diameter.

244. (Currently amended) The frit of claim 243, wherein the ~~secondary~~ particles are about 4 microns in diameter.

245.-248. (Canceled)

249. (Currently amended) The frit of claim 1, wherein the ~~secondary~~ particles have the same composition as the porous support structure.

250. (Currently amended) The frit of claim 1, wherein the ~~secondary~~ particles have a different composition than the porous support structure.

251. (Currently amended) The frit of claim 1, wherein the ~~secondary~~ particles are spherical stainless steel particles.

252.-253. (Canceled)

254. (Previously presented) The frit of claim 1 for use in a chromatography column.

255. (Previously presented) The frit of claim 254, wherein the chromatography column is a high pressure liquid chromatography (HPLC) column.

256. (Previously presented) The frit of claim 255, wherein the chromatography column is a high pressure liquid chromatography column packed with chromatographic packing materials with particle diameters of less than about 2.5 microns.

257. (Currently amended) The frit of claim 1, wherein the ~~secondary~~ particles fill the void spaces of the porous support structure to a depth of greater than about 10 microns.

258.-264. (Canceled)

265. (Previously presented) The frit of claim 254, wherein the chromatography column is packed with chromatographic packing materials.

266. (Previously presented) The frit of claim 265, wherein the chromatographic packing materials are selected from the group consisting of silica gel, derivatized silica gel, zirconia, derivatized zirconia, titanium oxide, derivatized titanium oxide, organo-silica hybrids, derivatized organo-silica hybrids, hybrids of metal oxides, and derivatized hybrids of metal oxides.

267. (Currently amended) The frit of claim 265, wherein the chromatographic packing materials have the same composition as the ~~secondary~~ particles.

268. (Currently amended) The frit of claim 265, wherein the chromatographic packing materials have a different composition than the ~~secondary~~ particles.

269. (Withdrawn - currently amended) A method of preparing a frit for use in a high pressure liquid chromatography column, comprising the steps of:

providing a porous support structure having a plurality of void spaces; [[and]]

filling the void spaces with ~~secondary~~ particles; [[.]]

sintering the particles within the porous support structure to each other, to the porous support structure surrounding the void spaces, or both;

wherein the void spaces are filled with the plurality of ~~secondary~~ particles such that the frit has a density of at least 50% by volume, and

wherein the ~~secondary~~ particles are dimensioned with respect to the void spaces for the frit to retain packing materials with diameters of less than about 2.5 microns, and

~~wherein the secondary particles are sintered within the porous support structure to each other, to the porous support structure surrounding the void spaces, or both.~~

270. (Withdrawn - currently amended) The method of claim 269, wherein the ~~secondary~~ particles fill the void spaces of the porous support structure to a depth of greater than about 10 microns.

271. (Withdrawn - currently amended) A method for separating and quantifying solutes in a liquid stream, comprising the steps of:

providing a tubular chamber having first and second ends, the tubular chamber being filled with chromatographic packing materials;

inserting at least one frit in the inlet and outlet fittings, the frit having:

a porous support structure having a plurality of void spaces,

a plurality of ~~secondary~~ particles sintered within the porous support structure to each other, to the porous support structure surrounding the void spaces, or both, the particles dimensioned with respect to the void spaces for the frit to retain packing materials with diameters of less than about 2.5 microns,

wherein the void spaces are filled with the plurality of ~~secondary~~ particles such that the frit has a density of at least 50% by volume[.],

~~wherein the secondary particles are dimensioned with respect to the void spaces such that the frit retains chromatography packing materials with particle diameters of less than about 2.5 microns, and~~

~~wherein the secondary particles are sintered within the porous support structure to each other, to the porous support structure surrounding the void spaces, or both;~~

propelling the liquid stream through the tubular chamber, the liquid stream contacting the chromatographic packing materials in the tubular chamber;

injecting a sample into the liquid stream; and



detecting individual components in the liquid stream as the liquid stream exits the second end of the tubular chamber.

272. (Withdrawn – currently amended) The method of claim 271, wherein the ~~secondary~~ particles fill the void spaces of the porous support structure to a depth of greater than about 10 microns.

273.-278. (Canceled)

### **REMARKS**

Claims 1, 2, 4, 8-11, 39, 40, 87, 118, 181, 237-246, 249-251, 254-257, and 264-278 are pending in the application. Claims 87, 118, 181, and 269-277 are withdrawn. Claims 1, 2, 4, 39, 87, 118, 181, 241-244, 249-251, 257, and 267-272 are currently amended. Claims 40, 238-240, 245, 246, 264, and 273-278 are canceled without prejudice or disclaimer. Accordingly, claims 1, 2, 4, 8-11, 39, 237, 241-244, 249-251, 254-257, and 265-268 will be pending in the application upon entry of the amendments presented herein.

Support for the claim amendments can be found throughout the specification and claims as originally filed. No new matter has been added.

In particular, support for the amendment to claims 1, 2, 4, 39, 87, 118, 181, 241-244, 249-251, 257, and 267-272, which removes the word "secondary" and also improves the style of several claims, can be found throughout the entire application as originally filed.

### ***Election of Restriction Group and Species***

Applicants maintain independent method claims 87, 118, 181, 269, and 271 pursuant to M.P.E.P. § 821.04(b), which states:

Process claims which depend from or otherwise require all the limitations of the patentable product will be entered as a matter of right if the amendment is presented prior to final rejection or allowance, whichever is earlier.

Applicants provide the following table summarizing the correspondence between each pair of system and method claims for the Examiner's convenience:

System Claim	Corresponding Method Claim(s)
1	269 & 271
39	87, 118, & 181

Accordingly, Applicants respectfully request rejoinder of method claims 87, 118, 181, 269, and 271 and the claims depending therefrom upon allowance of claims 1 and/or 39, respectively.

**35 U.S.C. § 112**

The Office Action rejects claims 1, 2, 4-11, 39, 40, 237-246, 249-251, 264-268, and 278 under 35 U.S.C. § 112, ¶ 2 as “indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.”

*“Secondary Particles”*

The Office Action rejects claims 1, 2, 4, 8-11, 39, 40, 237-246, 249-251, 254-257, 264-268, and 278 for the use of the term “secondary particles.”

Claims 1, 2, 4, 8-11, 39, 237-246, 249-251, 254-257, 264-268, and 278 are amended to remove the word “secondary” and claims 40, 238-240, 264, and 278 are canceled, thereby rendering this rejection moot.

*“Media Grade”*

The Office Action rejects claims 238-240, 245, 246, 277, and 278 for inclusion of the term “media grade.”

Claims 238-240, 245, 246, 277, and 278 are canceled, thereby rendering this rejection moot.

*Chromatographic Packing Materials*

The Office Action rejects claims 267 and 268 for referring to the composition of the chromatographic packing material.

Applicants respectfully assert that claims 267 and 268 are proper because they depend directly or indirectly from claim 254 in a similar manner as claim 256, which the Office Action deemed to be compliant with 35 U.S.C. § 112.

In view of these amendments and remarks, Applicants respectfully request the withdrawal of the rejection of claims 1, 2, 4-11, 39, 237, 241-244, 249-251, and 265-268 under 35 U.S.C. § 112, ¶ 2.

**35 U.S.C. § 103(a)**

The Office Action rejects claims 1, 2, 4, 8-11, 39, 40, 237-246, 249-251, 254-257, 264-268, and 278 under 35 U.S.C. § 103(a) over U.S. Patent No. 4,399,032 to Mott

(hereinafter "Mott") in view of Japanese Patent Application Publication No. 2004-177180 of Tajima et al. (hereinafter "Tajima") as translated by the Office.<sup>1</sup> Applicants respectfully traverse this rejection.

Applicants respectfully assert that this rejection is improper because Tajima does not constitute prior art under 35 U.S.C. §§ 102 and 103(a).

According to the translation provided by the Office, the publication date of the Tajima reference was June 24, 2004.

The instant application claims priority to U.S. Provisional Patent Application Serial No. 60/550,993 ("the '993 Application"), which was filed on March 5, 2004. Applicants respectfully assert that the '993 Application provides adequate written description for the claimed invention and complies with all other requirements under 35 U.S.C. § 119(e), thereby antedating the publication date of the Tajima reference.

Accordingly, Applicants respectfully request the withdrawal of the rejection of claims 1, 2, 4, 8-11, 39, 237, 241-244, 249-251, 254-257, and 265-268 under 35 U.S.C. § 103(a) over Mott in view of Tajima.

The Office Action rejects claim 237 under 35 U.S.C. § 103(a) over Mott in view of Tajima and in further view of U.S. Patent No. 4,719,011 to Shalon et al. (hereinafter "Shalon"). Applicants respectfully traverse this rejection.

As discussed above, Applicants respectfully assert that the Tajima reference does not constitute prior art because the instant application claims priority to the '993 Application, which antedates the publication of the Tajima reference.

Accordingly, Applicants respectfully request the withdrawal of the rejection of claim 237 under 35 U.S.C. § 103(a) over Mott in view of Tajima and in further view of Shalon.

### ***Conclusion***

In view of the foregoing, Applicants respectfully request entry of the amendments and remarks presented herein, reconsideration and withdrawal of all rejections and

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<sup>1</sup> In order avoid delays in prosecuting this application, Applicants have not obtained an independent translation of Tajima. Applicants reserve the right to do so in the future and to assert that the Office's

allowance of the application with claims 1, 2, 4, 8-11, 39, 237, 241-244, 249-251, 254-257, and 265-268 and rejoinder of claims 87, 118, 181, and 269-277.

If a telephone conversation with Applicants' representatives would be helpful to resolve any further issues regarding the restriction requirement and/or expedite further prosecution of the application, Applicants invite the Examiner to contact the undersigned at the telephone number listed below.

Dated: January 24, 2011

Respectfully submitted,

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translation is ambiguous and/or inaccurate.